CLAIMS

[1] A webbing retractor comprising: a take-up shaft on which webbing for restraining a vehicle occupant is wound so as to be able to be taken-up thereon and pulled-out therefrom, a motor, and a clutch which is mechanically interposed between the motor and the take-up shaft, and transfers rotation of the motor to the take-up shaft and rotates the take-up shaft, and cuts-off transfer of rotation generated at the take-up shaft side and prevents the rotation from being transferred to the motor, wherein the clutch comprises:

a gear wheel provided coaxially to the take-up shaft, and rotating due to rotation of the motor being transferred thereto;

a rotor provided coaxially to the gear wheel;

a lock bar provided at the rotor and usually held at a position of released engagement with the take-up shaft, and when the rotor rotates in a first direction around an axis, the lock bar engages the take-up shaft and transfers rotation of the rotor to the take-up shaft, and when the rotor rotates in a second direction around the axis, the lock bar is moved to and held at the position of released engagement; and

a spring claw provided between the gear wheel and the rotor along a peripheral direction, and transferring rotation of the gear wheel to the rotor, and when load of greater than or equal to a predetermined value is applied to the rotor, the spring claw cuts-off transfer of the rotation by the load, and makes the gear wheel and the rotor able to run idly relatively, and

the gear wheel includes a peripheral direction load receiving portion which receives, along a peripheral direction, load applied from the spring claw.

[2] The webbing retractor of claim 1, wherein the first direction is a webbing take-up direction, and the second direction is a webbing pull-out direction.

[3] The webbing retractor of claim 1, wherein

the rotor includes external teeth at an outer peripheral portion, and

due to a distal end portion of the spring claw engaging with the external teeth of the

rotor and a proximal end portion engaging with the gear wheel, the spring claw transfers rotation of the gear wheel to the rotor.

[4] The webbing retractor of claim 3, wherein the spring claw is formed in a shape of a plate having elasticity, and when load of greater than or equal to predetermined value is applied to the rotor, due to the spring claw elastically deforming due to the load and pulling-out the distal end portion from the external teeth of the rotor, the spring claw makes the gear wheel and the rotor able to run idly relatively.

[5] The webbing retractor of claim 1, wherein the clutch further comprises:

a case; and

a slider which can move relative to the rotor within a predetermined range by being held at the case by frictional force, and

the lock bar is held at the position of released engagement by the slider.

[6] The webbing retractor of claim 5, wherein the lock bar is always urged in a direction of engaging with the take-up shaft, and when the rotor rotates in the first direction, the lock bar moves so as to move apart from the slider and the holding is released and the lock bar engages with the take-up shaft by the urging force, and when the rotor rotates in the second direction, the lock bar moves so as to approach the slider and is moved to and held at the position of released engagement by the slider.

[7] The webbing retractor of claim 1, wherein rotation of the gear wheel is transferred to the rotor due to a proximal end portion of the spring claw abutting the peripheral direction load receiving portion of the gear wheel.

[8] The webbing retractor of claim 1, wherein the clutch further comprises a ring,

the ring includes a cover portion disposed at an axial direction one side of the rotor, and holding the gear wheel and the lock bar at predetermined assembly positions, and

the spring claw is formed integrally with the cover portion of the ring, and holds the

ring at the rotor by elastic force thereof.

[9] The webbing retractor of claim 1, wherein the clutch further comprises:

a ring;

a spring urging the lock bar in a direction of engaging with the take-up shaft; and

a holder restricting axial direction displacement of the lock bar with respect to the rotor, and

the ring holds the gear wheel, the slider, the lock bar, the spring, and the holder at predetermined assembly positions.

[10] A webbing retractor comprising: a take-up shaft on which webbing for restraining a vehicle occupant is wound so as to be able to be taken-up thereon and pulled-out therefrom, a motor, and a clutch which is mechanically interposed between the motor and the take-up shaft, and transfers rotation of the motor to the take-up shaft and rotates the take-up shaft in the webbing take-up direction, and cuts-off transfer of rotation generated at the take-up shaft side and prevents the rotation from being transferred to the motor, wherein the clutch comprises:

a case;

a gear wheel provided coaxially to the take-up shaft, and rotating due to rotation of the motor being transferred thereto;

a rotor provided coaxially to the gear wheel, and having external teeth at an outer peripheral portion;

a slider which can move relative to the rotor within a predetermined range by being held at the case by frictional force;

a lock bar provided at the rotor, and always urged in a direction of engaging with the take-up shaft, and usually held by the slider at a position of released engagement with the take-up shaft, and when the rotor rotates in the webbing take-up direction, the lock bar moves so as to move apart from the slider, and the holding is released, and the lock bar engages with the take-up shaft due to the urging force, and transfers rotation of the rotor to the take-up shaft, and permits relative rotation of the take-up shaft in the webbing take-up

direction with respect to the rotor, and when the rotor rotates in the webbing pull-out direction, the lock bar moves so as to approach the slider, and is moved to and held at the position of released engagement by the slider; and

a spring claw formed in a shape of a plate having elasticity, and provided between the gear wheel and the rotor along a peripheral direction, and a distal end portion of the spring claw engages with the external teeth of the rotor, and a proximal end portion of the spring claw engages with the gear wheel, and the spring claw transfers rotation of the gear wheel to the rotor, and when load of greater than or equal to a predetermined value is applied to the rotor, the spring claw elastically deforms due to the load, and pulls-out the distal end portion from the external teeth, and makes the gear wheel and the rotor able to run idly relatively, and

the gear wheel includes a peripheral direction load receiving portion which receives, along a peripheral direction, load applied from the spring claw.

[11] The webbing retractor of claim 10, wherein the clutch further comprises a ring,

the ring has a cover portion disposed at an axial direction one side of the rotor, and holding the gear wheel and the lock bar at predetermined assembly positions, and

the spring claw is formed integrally with the cover portion of the ring, and holds the ring at the rotor by elastic force thereof.

[12] The webbing retractor of claim 10, wherein the clutch further comprises:

a ring;

a spring urging the lock bar in a direction of engaging with the take-up shaft; and

a holder restricting axial direction displacement of the lock bar with respect to the rotor, and

the ring holds the gear wheel, the slider, the lock bar, the spring, and the holder at predetermined assembly positions.

[13] The webbing retractor of claim 10, wherein rotation of the gear wheel is transferred to the rotor due to a proximal end portion of the spring claw abutting the peripheral direction

load receiving portion of the gear wheel.

[14] A webbing retractor comprising: a take-up shaft on which webbing for restraining a vehicle occupant is wound so as to be able to be taken-up thereon and pulled-out therefrom, a motor, and a clutch which is mechanically interposed between the motor and the take-up shaft, and transfers rotation of the motor to the take-up shaft and rotates the take-up shaft, and cuts-off transfer of rotation generated at the take-up shaft side and prevents the rotation from being transferred to the motor, wherein the clutch comprises:

a gear wheel provided coaxially to the take-up shaft, and rotating due to rotation of the motor being transferred thereto;

a rotor provided coaxially to the gear wheel;

a lock bar provided at the rotor and usually held at a position of released engagement with the take-up shaft, and when the rotor rotates in a first direction around an axis, the lock bar engages the take-up shaft and transfers rotation of the rotor to the take-up shaft, and when the rotor rotates in a second direction around the axis, the lock bar is moved to and held at the position of released engagement; and

a ring including a cover portion disposed at an axial direction one side of the rotor and holding the gear wheel and the lock bar at predetermined assembly positions, and a spring claw formed integrally with the cover portion and provided between the gear wheel and the rotor and transferring rotation of the gear wheel to the rotor, and when load of greater than or equal to a predetermined value is applied to the rotor, the spring claw cuts-off transfer of the rotation by the load and makes both able to run idly relatively, and the ring is held at the rotor by elastic force of the spring claw.

[15] The webbing retractor of claim 14, wherein the gear wheel includes a peripheral direction load receiving portion which receives, along a peripheral direction, load applied from the spring claw.

[16] The webbing retractor of claim 14, wherein the first direction is a webbing take-up direction, and the second direction is a webbing pull-out direction.

[17] The webbing retractor of claim 14, wherein

the rotor includes external teeth at an outer peripheral portion, and

due to a distal end portion of the spring claw engaging with the external teeth of the rotor and a proximal end portion engaging with the gear wheel, the spring claw transfers rotation of the gear wheel to the rotor.

[18] The webbing retractor of claim 17, wherein, when load of greater than or equal to a predetermined value is applied to the rotor, due to the spring claw elastically deforming due to the load and pulling-out the distal end portion from the external teeth of the rotor, the spring claw makes the gear wheel and the rotor able to run idly relatively.

[19] The webbing retractor of claim 15, wherein rotation of the gear wheel is transferred to the rotor due to a proximal end portion of the spring claw abutting the peripheral direction load receiving portion of the gear wheel.

[20] The webbing retractor of claim 14, wherein the clutch further comprises:

a case;

a slider which can move relative to the rotor within a predetermined range by being held at the case by frictional force;

a spring urging the lock bar in a direction of engaging with the take-up shaft; and

a holder restricting axial direction displacement of the lock bar with respect to the rotor, and

the ring holds the gear wheel, the slider, the lock bar, the spring, and the holder at predetermined assembly positions.

[21] A webbing retractor comprising: a take-up shaft on which webbing for restraining a vehicle occupant is wound so as to be able to be taken-up thereon and pulled-out therefrom, a motor, and a clutch which is mechanically interposed between the motor and the take-up shaft, and transfers rotation of the motor to the take-up shaft and rotates the take-up shaft

in the webbing take-up direction, and cuts-off transfer of rotation generated at the take-up shaft side and prevents the rotation from being transferred to the motor, wherein the clutch comprises:

a case;

a gear wheel provided coaxially to the take-up shaft, and rotating due to rotation of the motor being transferred thereto;

a rotor provided coaxially to the gear wheel;

a slider which can move relative to the rotor within a predetermined range by being held at the case by frictional force;

a lock bar provided at the rotor, and always urged in a direction of engaging with the take-up shaft, and usually held by the slider at a position of released engagement with the take-up shaft, and when the rotor rotates in the webbing take-up direction, the lock bar moves so as to move apart from the slider, and the holding is released, and the lock bar engages with the take-up shaft due to the urging force, and transfers rotation of the rotor to the take-up shaft, and permits relative rotation of the take-up shaft in the webbing take-up direction with respect to the rotor, and when the rotor rotates in the webbing pull-out direction, the lock bar moves so as to approach the slider, and is moved to and held at the position of released engagement by the slider; and

a ring including a cover portion disposed at an axial direction one side of the rotor and holding the gear wheel, the slider and the lock bar at predetermined assembly positions, and a spring claw formed integrally with the cover portion and provided between the gear wheel and the rotor and transferring rotation of the gear wheel to the rotor, and when load of greater than or equal to a predetermined value is applied to the rotor, the spring claw cuts-off transfer of the rotation by the load and makes the gear wheel and the rotor able to run idly relatively, and the ring is held at the rotor by elastic force of the spring claw.

[22] The webbing retractor of claim 21, wherein the gear wheel includes a peripheral direction load receiving portion which receives, along a peripheral direction, load applied from the spring claw.

[23] The webbing retractor of claim 22, wherein rotation of the gear wheel is transferred to the rotor due to a proximal end portion of the spring claw abutting the peripheral direction load receiving portion of the gear wheel.

[24] The webbing retractor of claim 21, wherein the clutch further comprises:

a spring urging the lock bar in a direction of engaging with the take-up shaft; and

a holder restricting axial direction displacement of the lock bar with respect to the rotor, and

the ring holds the gear wheel, the slider, the lock bar, the spring, and the holder at predetermined assembly positions.